

# WLS-C

*Wheel Loader Scale*

## Installation & User Manual



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Technical training seminars are available through Rice Lake Weighing Systems. Course descriptions and dates can be viewed at [www.ricelake.com/training](http://www.ricelake.com/training) or obtained by calling 715-234-9171 and asking for the training department.

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# Introduction

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This manual is intended for use by technicians responsible for installing and servicing the WLS-C Wheel Loader Scale.



Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at [www.ricelake.com](http://www.ricelake.com).

Unpack the contents of the shipment your system arrived in and verify the contents are correct, using the packing slip. Check for damage that could have occurred during shipment, and report any discrepancies immediately.

Before installing, ensure you have the following:

- Welder
- Mechanical and electrical tools
- Set of assorted wrenches
- Set of assorted screwdrivers
- Grinder
- Voltmeter
- Assorted hydraulic fittings



## Warning

If washing the machine with a high-pressure power washer, you must protect all system components from direct spraying to avoid damage.

Before installing the WLS-C Wheel Loader Scale, take the following measures to ensure your safety:

## Protective Gear

Always wear safety goggles, as required by safety conditions, when welding or grinding.

Never wear loose clothing or jewelry, which may get caught in the machine.

## Hydraulic Parts

Discharge all pressure from the hydraulic circuit before disconnecting or removing any plumbing, connector, or relative component. Always make certain that all moving parts have been locked and check for any residual pressure when disconnecting any hydraulic plumbing.

Always let the bucket or other similar parts down to ground-level before carrying out any work on the machine. If this cannot be done, make sure that bucket is locked so it cannot come suddenly and unexpectedly down.

Damaged or detached fuel and lubricant lines can cause fire. Never bend or strike high pressure lines, nor put damaged or twisted ones back on. Always check pipes and ducts.

## Repairs

Detach the battery and let any remaining charge out before carrying out any work on the vehicle.

If possible, have the vehicle brought into a shed or onto a hard, clean floor.

## 1.0 Installation

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When installing the components, use the appropriate brackets supplied. These can be mounted inside the cab onto the cab structure. It is recommended that you consult the machine's operator to ensure the indicator is mounted in a convenient location based on their needs. Make sure the components do not restrict the operator's vision or interfere with bodily movements.

On forklift trucks, the unit is mounted directly under the roof. You will need to make threaded holes in the frame.



## Warning

Do not attach the brackets to the dashboard or other non-metallic surface. Prior to altering the cab structure, customer approval should be attained due to EROPS and ROPS certifications.



Indicator



Pressure transducer



Angle sensor



Indicator with wiring (see Table 1-1 for cable details)



Pressure transducer cable



Proximity Sensor and Cable



Figure 1-1. WLS-C Component List

Wire	Connect To
PT1	Pressure transducer
PT2	Second pressure transducer (optional)
Prox1	Angle sensor on chassis
Prox2	Angle sensor on boom
Power (Brown/White)	Positive terminal on battery
Power (Green/Yellow)	Negative terminal on battery

Table 1-1. Cable Harness

## 1.1 Indicator Installation

1. Use the bracket as a template to drill holes. Then, mount the bracket. Or, use the suction cup mount.
2. Fasten screws holding the bracket in place. The bracket can now accept the indicator.
3. Loosen the bracket handle shown in Figure 1-2, find the desired angle, and tighten the handle.



Bracket handle

Figure 1-2. Bracket screwed in place



*Figure 1-3. Indicator Mounted in Cab*



*Figure 1-4. Indicator Back*

## 1.2 Pressure Sensor Installation

The pressure sensor reads the main line pressure of the lift cylinder (hydraulic line). Only one sensor is required; however, the WLS-C Wheel Loader Scale may be used with two pressure sensors if needed. There are two options for pressure sensor installation:

- Install a flange block where the hydraulic line attaches to the hydraulic fluid distributor. Use one of the fittings supplied to attach the sensor to the flange block. The kit comes with a few common fittings which fit the majority of wheel loaders. It may be required to locate special fittings for the installation. See Figure 1-5 through Figure 1-8 for a list of provided fittings.

**NOTE:** Some manufacturers do not use flange blocks. In these cases, use a swivel T-fitting.

- Attach the weld-on flange (supplied, see Figure 1-7 4) directly to the hydraulic line. This should be performed by a qualified welder to ensure proper fitting and seal.

**Note:** The best source for flange blocks is the local wheel loader or skid steer dealer that sold the machine originally. An alternative source for flange blocks is [www.mainmfg.com/mainhome.html](http://www.mainmfg.com/mainhome.html).



Figure 1-5. 1/4" BSPP Straight Fitting



Figure 1-6. 1/4" NPT Male to 1/4" Female Straight Fitting

Pressure sensors are equipped with 1/4" BSPP threads; therefore, the fittings shown in Figure 1-5 and Figure 1-6 can be connected directly to the sensor with the copper o-ring seal (see Figure 1-9) in between. This seal must be installed on all sensors to ensure an air-tight seal.

**Notes:** The copper o-ring seal has a smooth side and a rough side. The seal should be installed so the smooth side touches the sensor.

There is also a rubber gasket on the sensor (see Figure 1-13 on page 6). Keep this in a safe place until ready to install, as it falls off easily.

The fittings shown in Figure 1-5, Figure 1-6 and Figure 1-8 can be connected directly to the valve of the machine. The weld-on fitting (Figure 1-7) can be used on the steel tubing of the cylinder line if you cannot tap the line.

The fitting shown in Figure 1-8 cannot be connected directly to the pressure sensor due to a 37-degree flare swivel end.

1. Select the fitting which works best.
2. Attach the fitting to the hydraulic valve.

**Note:** The hydraulic line may need to be removed if using the weld-on flange.

3. The fitting should be mounted in a position to allow it to self-bleed with gravity. If possible, mount at an angle rather than perpendicular to the hydraulic line. (See Figure 1-10 through Figure 1-13 for examples).



Figure 1-7. Weld-on Flange



Figure 1-8. 1/4" NPT male to 1/4" BSPP Female Swivel 90-Degree Fitting



Figure 1-9. Copper O-Ring Seal



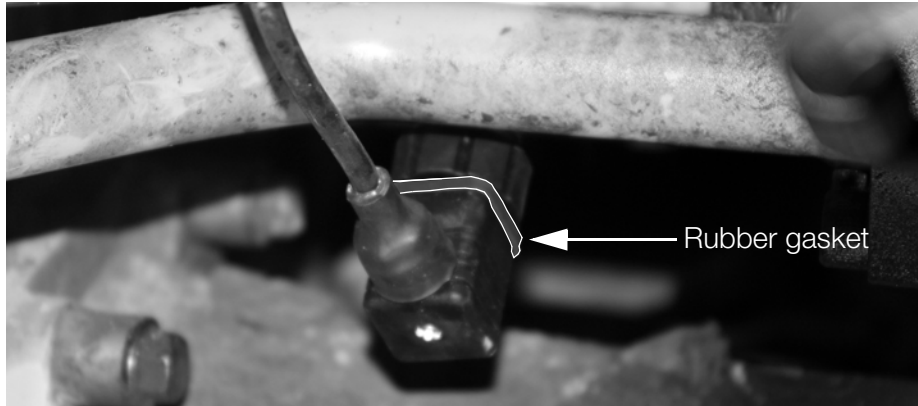
*Figure 1-10. Flange Welded to Hydraulic Line at Desired Angle*



*Figure 1-11. Sensor Mounted at Non-Recommended Angle*



*Figure 1-12. Sensor Mounted at Recommended Angle*



*Figure 1-13. Sensor Mounted at Recommended Angle; Rubber Gasket Highlighted*

4. Place the copper o-ring between the sensor and fitting (with the smooth side towards the sensor) and tighten the sensor with a crescent wrench.
5. Once the sensor is mounted, the hydraulic line can be bled.
6. After starting the machine, partially loosen the sensor.
7. Wait until fluid leaks out without any air bubbles before tightening it down.
8. Route wire back to the cab. Route along a stationary area; tying to existing electrical lines is recommended.
9. Tie off excess wire in an open area of the wheel loader.
10. Check for leaks again after running the machine for a short period of time.

### **1.3 Proximity Sensors Installation**

Positioning the proximity sensors is extremely important for the accuracy of weighing during the lifting stage.

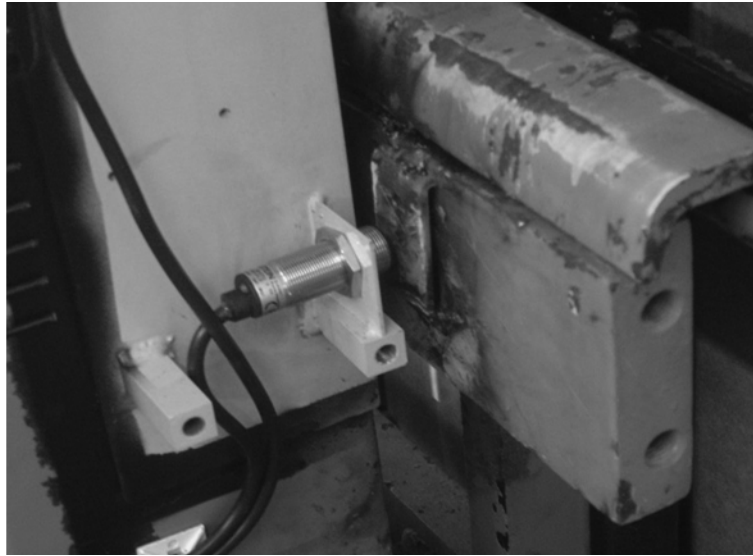
You must make sure you install them in such a way that the lifting reference notch activates the first proximity switch, and that it remains active even when the second has been activated.

If the weighing system is running properly, the acoustic indicator will go off after the second proximity has been reached. This means a measurement has been made. On the other hand, when the vehicle arm is coming down, it must first activate the second proximity, and then the first. This is so weighing takes place only during lifting and not lowering.

In forklift trucks, the distance between the two must be about 20 cm, given the speed at which the forks rise.

This layout has been tested on many different models, and has been seen to be the best, because hydraulic pressure tends to remain more stable and give a greater proportional increase. For forklifts, we suggest you place the first switch 40–50 cm above the lowest point. See Figure 1-15 on page 7

**NOTE:** The proximity switch cannot read if positioned more than 5 mm away from the reading plate. You should always try to place them about 2–3 mm apart.



*Figure 1-14. Location of Installed Proximity Sensor*

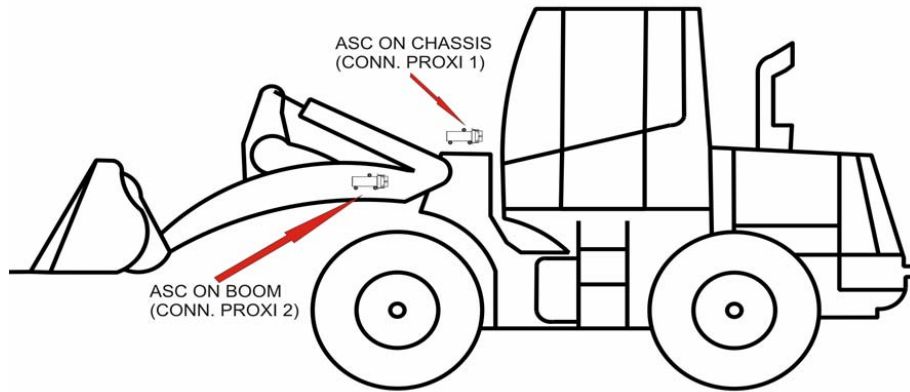


*Figure 1-15. Installation Location of First Switch*

## 1.4 Angle Sensor Installation

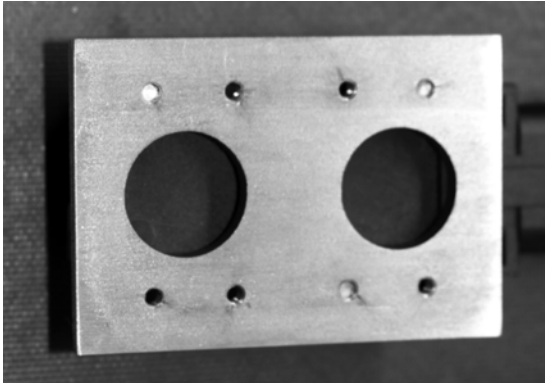
Place the chassis and boom angle sensors as shown in Figure 1-16. They should both be horizontal with the connector in the cabin direction.

Two sensors are necessary because the relative angle between the chassis and the boom is used to perform the weighing computation.



*Figure 1-16. Sensor Placement*

1. Using two to three 1" beads, weld the angle sensor's mounting plate to the inside of the support arm.



Mounting plate



Mounting plate with angle sensor attached.

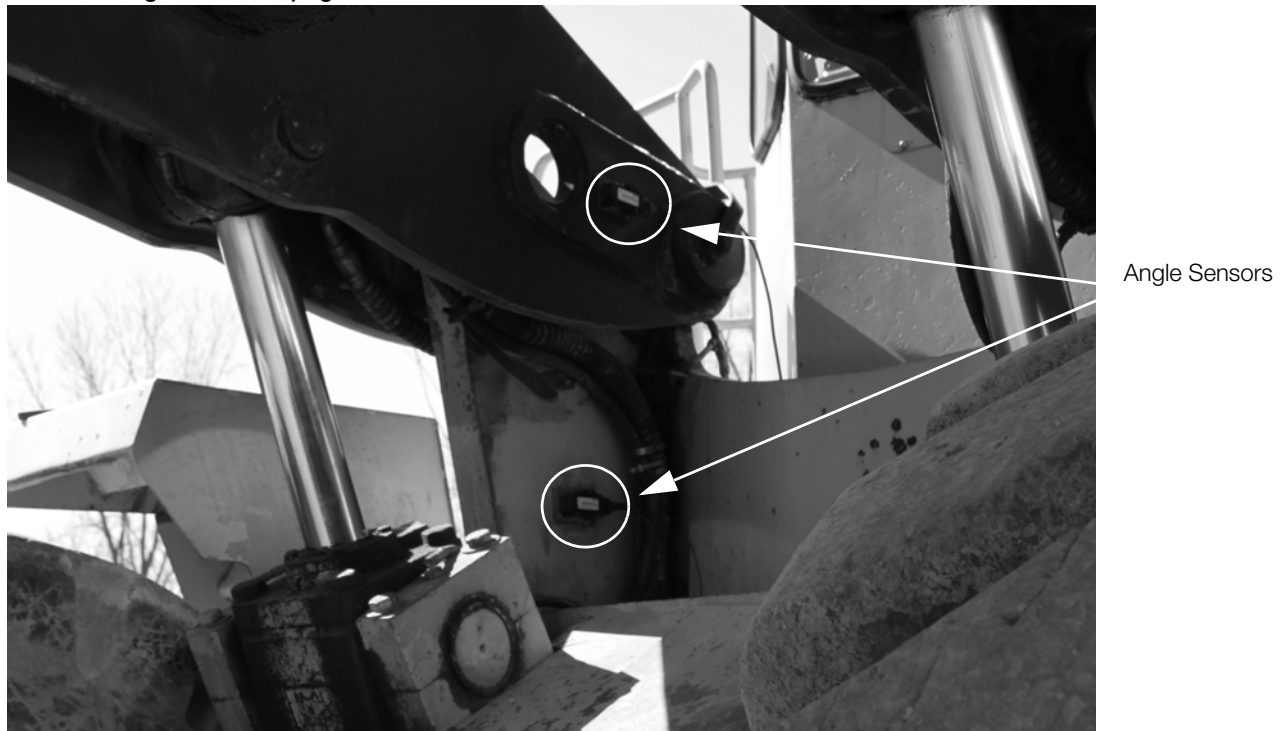
*Figure 1-17. Angle Sensor Mounting Plate*

2. Fasten the sensor housing and angle sensor to the mounting plate.



*Figure 1-18. Angle Sensor Installed On Support Arm*

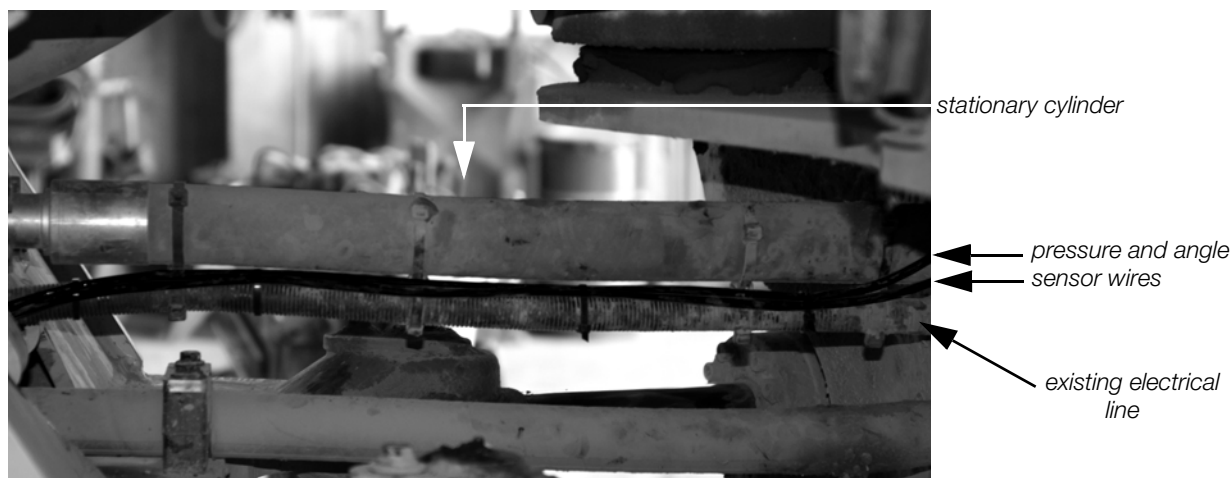
**NOTE:** Angle sensors should be installed in line with the opening and bolt for the arm and must parallel on the boom. There are 3 bolts on the angle sensor: 1 on top and 2 on the bottom. The angle sensor should be installed so that the 1 bolt side faces up and the side with 2 bolts faces down. If installed correctly, the wire will be toward the cab of the loader. See Figure 1-19 on page 9.



*Figure 1-19. Angle Sensors Installed*

3. Route the sensor's wire back to the cab.

**NOTES:** Ensure there is enough slack in the wire to allow the support arm to raise fully without over-tightening the wire. Route along a stationary area of the wheel loader. Figure 1-20 shows the pressure sensor and angle sensor wires routed between a stationary cylinder and existing electrical line; this provides optimal protection.



*Figure 1-20. Wires Routed Along Existing Electrical Line.*

4. Tie off excess wire in an open area of the wheel loader.

## 1.5 Passing and Protecting Cables

Cables should, if possible, pass along the same route as the electrics cables of your vehicle, or at least where the hydraulic circuitry passes.

This means that there are basically two cables to protect: proximity and transducer cables.

You should always leave some leeway for the cables. When giving full-lock steering to the left and right, the cables should not become too tight or too slack.



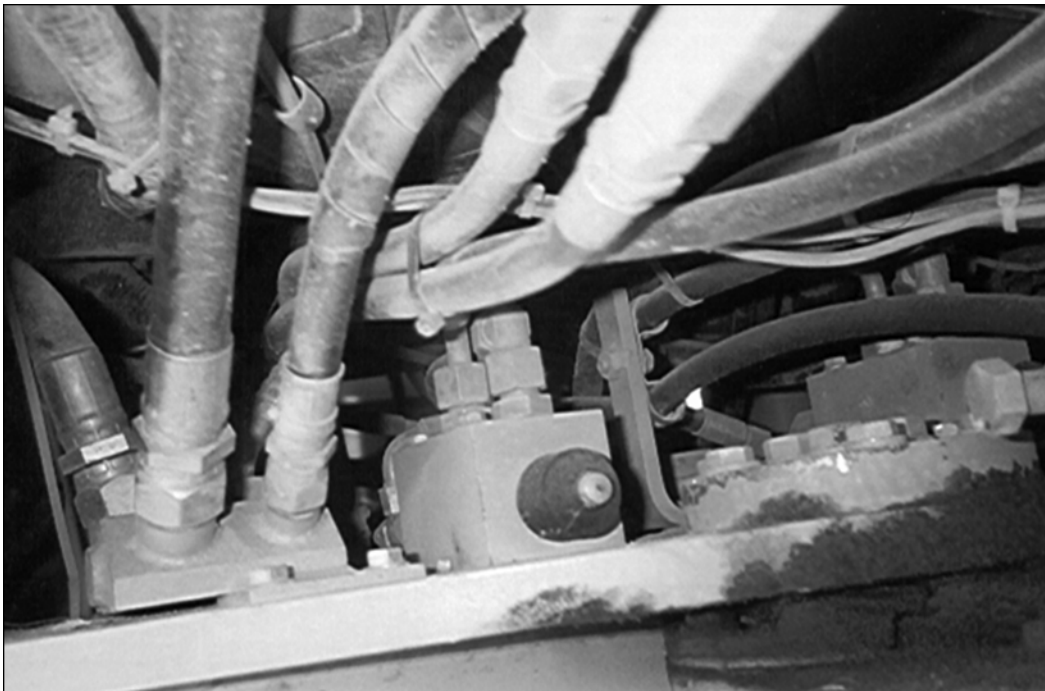
*Figure 1-21. Proper Amount of Slack in Cables*



*Figure 1-22. Cables Routed Correctly*

Do not mount the cables too close to the motor, unless they are well insulated.

If you use clips to fix the cables down, remember not to tighten them too much. Very often, cable breakage is due to over-tightened clips.

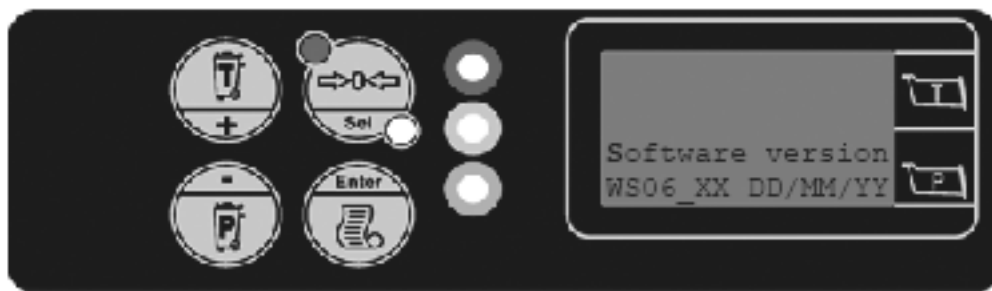


*Figure 1-23. Cables Clipped Properly*

## 2.0 Display Indications and Button Functions

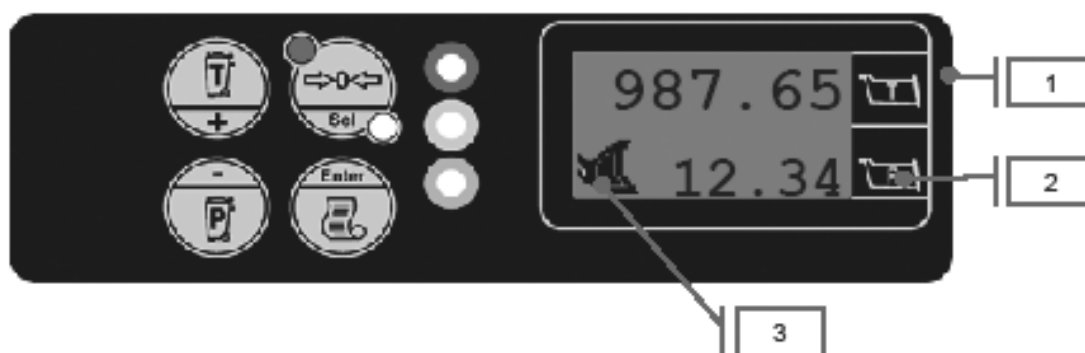
### 2.1 Indicator Display

Once power is applied, the system performs a self-test and displays the software version and the date of the latest upgrade. For example, WS06\_05 (WS06\_XX) 28/2/2010 (DD/MM/YY).



*Figure 2-1. WLS-C Software Version and Date of Last Update*

This screen is visible for only a few moments before it clears and displays the weighing screen.



*Figure 2-2. Weighing Screen*

1. Total Weight
2. Partial Weight
3. Active Weighing Mode

## 2.2 Indicator Buttons

Indicator buttons are your interface for communicating with the indicator.

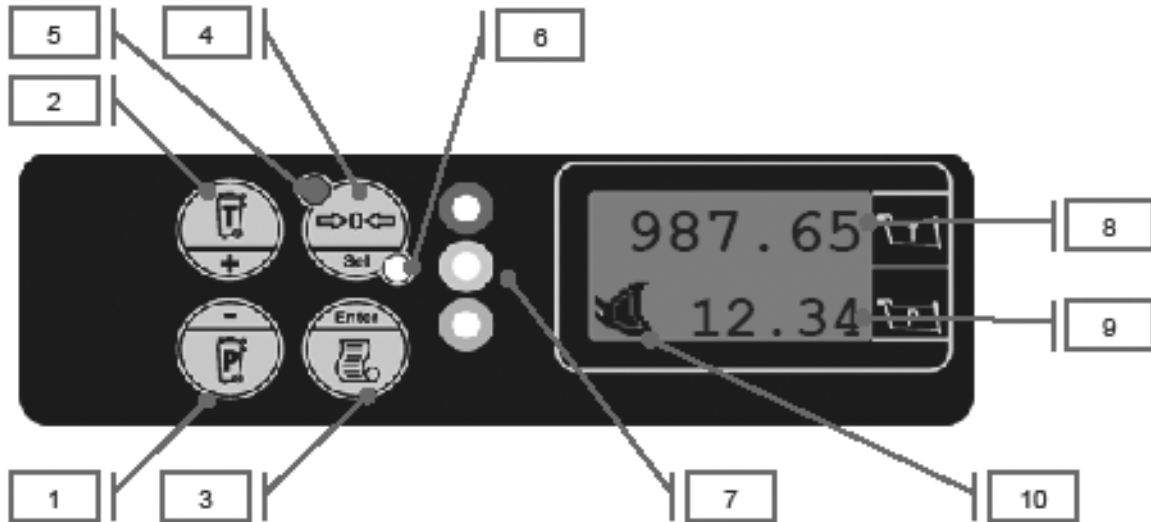


Figure 2-3. Indicator Keypad Buttons

Number referenced in Figure 2-3	Button	Function
1 Total/Plus		Press and hold for 3 seconds to zero. In static weighing mode without input, this button adds the partial load to the total.
2 Partial/Minus		Partial zeroing button.
3 Print/Enter		Press and hold for 3 seconds to access Operation menu. Press and release once to print ticket (optional printer)
4 Tare/Sel		Press and release once to memorize new Tare. Press and hold for 3 seconds for zeroing the Tare value.
5		When lit indicates Tare value is other than zero.
6		When lit indicates Tare value equals zero.
7		Indicator lights warning for maximum load. See “Setting Max Load” on page 25. for more information.
8	987.65	Total Weight
9	12.34	Partial Weight
10		Symbol of active weighing mode.

Table 2-1. Keypad Button Functions

## 3.0 Calibration

To calibrate the WLS-C, you must enter calibration mode. This allows you to alter system settings.

### 3.1 Entering Calibration Mode

Use the following procedure to access the calibration menu from the operating screen.

1. Press and hold the Print/Enter button until the User Menu appears.
2. Scroll down the menu list using the Partial/Minus button to reach the Setting Menu.



Figure 3-1. Setting Menu

3. Press and release the Print/Enter button to enter the menu.  
The display indicates CAL: PIN 0.

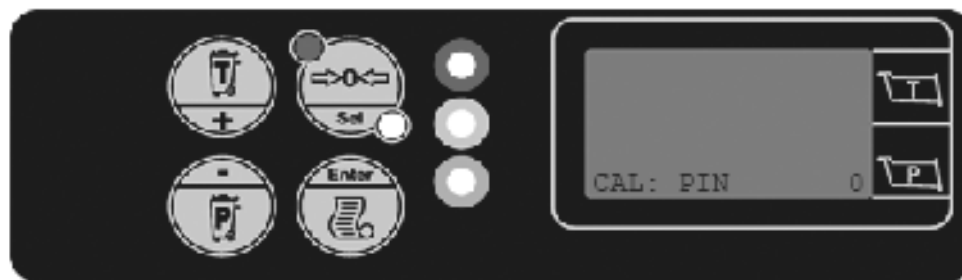


Figure 3-2. Enter Calibration PIN

4. Enter the password 4482 to access the calibration area. See “Setting New Values” on page 21. to complete changes.

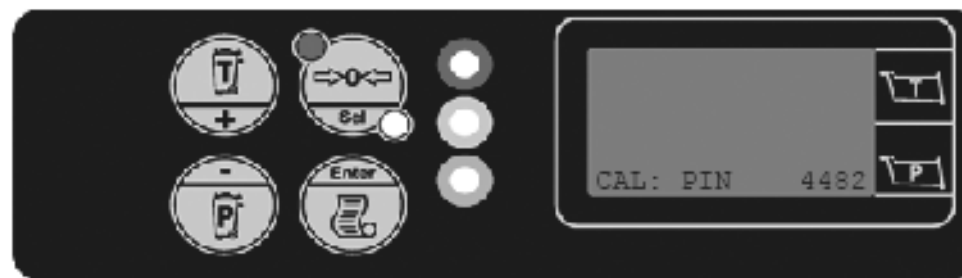


Figure 3-3. Calibration PIN Entered

Once the values are entered, follow the procedure below to confirm it.

1. Press and release the Print/Enter button to confirm the changes made.  
The asterisk will disappear.
2. Press and release the Partial/Minus button.

3. Press and release the Print/Enter button to confirm the password.

You can scroll to another page of the menu by using the Partial/Minus button or go back a menu by pressing and holding the Tare/Sel button.

## 3.2 Parameters

Prior to performing the empty and/or loaded calibration on both Dynamic or Static weighing systems, you must set the system's general parameters in the Machine Setting menu.

### Setting and Saving Parameters

To gain access to the Machine Setting menu press and release the Print/Enter button when in the Setting Menu.



Figure 3-4. Setting Menu

## 3.3 Angle Calibration

Angle calibration is used with ASC angle sensors only.

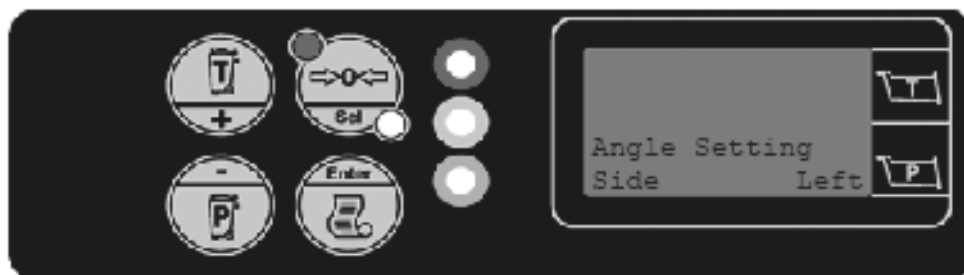


Figure 3-5. Angle Setting

Setting	Description
Side	The position of angle sensor on the boom, (LEFT-RIGHT), press and release the Print/Enter button to change the mounting side. Left is standard.
Act Angle	The actual value of relative angle, or the difference between the angles of boom and chassis. Angle value if left side should be positive value
Start Ang	The value of relative angle for the start weighing point selected.
Get Start Angle	Press and release the Print/Enter button to memorize the actual value of relative angle as the start weighing angle with the boom in the start weighing position. Angle value if left side should be positive value.
End Ang	The value of relative angle for the end weighing.
Get End Angle	Press and release the Print/Enter button to memorize the actual value of relative angle as end weighing angle. Angle value if left side should be positive value
Reset Ang	The value of relative angle for concluding the weighing and start with a new weighing.

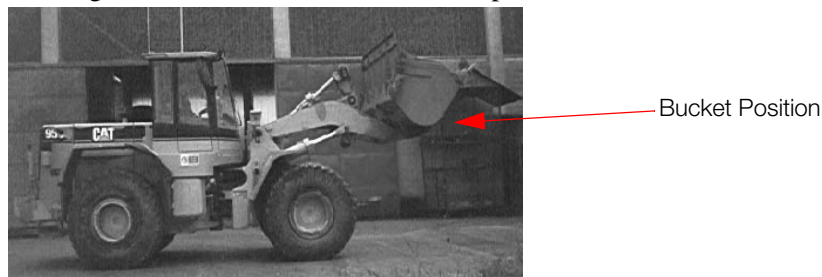
Table 3-1. Angle Settings

Setting	Description
Get Reset Angle	Press and release the Print/Enter button to memorize the actual value of relative angle to reset the weighing angle cycle. Should be set around 10 degrees lower than start weigh value. Angle value if left side should be positive value.
Delete Angles	Press and release the Print/Enter button to erase all angles value (Start Ang., End Ang., Reset Ang.).
Save	To save the angle calibration values to the memory. Must be done after completing to save the data to the memory.

*Table 3-1. Angle Settings*

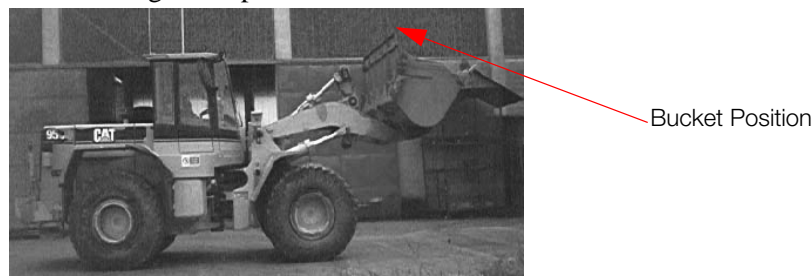
### 3.3.1 Calibration procedure

1. Scroll to the Get Start Angle menu.
2. Raise the bucket up to the start weighing area point. Bucket should be straight. See Figure 3-6.
3. Press and release the Print/Enter button to store the value.
4. Scroll to the Act Angle and record the value. An example value is 146.



*Figure 3-6. Bucket Position for Get Start Angle*

5. Raise the bucket until the Act Angle value is 100 points higher than the Start Angle Value. An example value is 245. See Figure 3-7.
6. Scroll to the Get End Angle and press and release the Print/Enter button to store that end value.



*Figure 3-7. Bucket Position for Start Angle Value*

7. Lower the bucket about one foot from the ground level. See Figure 3-8.
8. Scroll to the Get Reset Angle menu.
9. Press and release the Print/Enter button to store that value.

10. Scroll down to the Save and save the Angle Cal



Bucket Position

Figure 3-8. Bucket Position for Get Reset Angle

### 3.4 Dynamic Calibration

Use the following procedure to access the dynamic calibration menu from the operating screen.

1. Scroll using the Partial/Minus button to the Dynamic Cal. menu from the Setting Menu.
2. Select empty or loaded calibration (Empty Cal. or Loaded Cal.).

**NOTE:** If the WLS-C has been configured for static weighing mode, access to this menu will be denied.



Figure 3-9. Dynamic Calibration

## 3.5 Empty Calibration

### 3.5.1 Performing an Empty Calibration

User the following procedure to perform an empty calibration.

1. Scroll to Empty Cal. from the Dynamic Cal. menu.
2. Perform 10 empty lifts at decreasing RPM settings, starting at the max RPM with the bucket closed.

### 3.5.2 Empty Calibration Options

The menu includes the following data:

Setting	Description
Time	Time elapsed during the lift, the lower this value is, the greater the speed of the lift cycle.
TP1 value	Indicates the piston's pressure transducer reading.
TP2 value	Indicates the rod's pressure transducer reading (if installed).
EmptyLoad1	Set the real load for calibration 1 usually is set to "0", because the calibration is performed with the machine empty
ET1 <sup>1</sup> point	Displays the number of lifts performed at decreasing speed, which will correspond to the number of points recorded in empty calibration1 table, (refer ET1 xxxx: -xxxxx)
ET1 xxxx: -xxxxx	Allows viewing the complete empty calibration 1 table, it is possible to view two values: the left value corresponds the index table, whereas the value on the right corresponds the acquired value of the table. See Table 3-3.
EmptyLoad2	Set the real load for calibration 2 usually is set to "0", because the calibration is performed with the machine empty: if different, insert the value according to the machine's capacity, keeping in mind the decimals to be displayed, and the resolution preferred (this value can also be set at the end of the calibration).
ET2 <sup>2</sup> point	Displays the number of lifts performed at decreasing speed, which will correspond to the number of points recorded in empty calibration 2 table, (refer ET2 xxxx: -xxxxx)
ET2 xxxx: -xxxxx	Allows viewing the complete empty calibration 2 table. It is possible to scroll through the table by selecting the index number.
Delete Cal. 1	Used to delete calibration 1 data.
Delete Cal. 2	Used to delete calibration 2 data.
Save	To save all modifications to the empty calibration.

Table 3-2. Empty Calibration Settings

1. Table empty calibration 1 - First machine
2. Table empty calibration 2 - Second machine, if exists

**NOTE:** Once the empty calibration of 10 lifts is completed you must save the data to the memory.

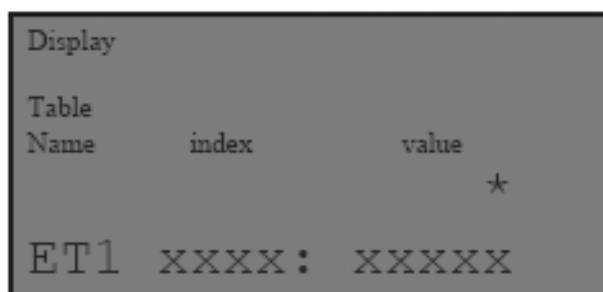
Index Range 0-59, Points Table Range 0-19

Index	Table	Description
0	1	Time
1	1	Back side cylinder pressure or differential pressure
2	2	Time

Table 3-3. Index and Table Range

Index	Table	Description
3	2	Back side cylinder pressure or differential pressure
4	3	Time
5	3	Back side cylinder pressure or differential pressure
6	4	Time
7	4	Back side cylinder pressure or differential pressure
X	N	Time
Y	N	Back side cylinder pressure or differential pressure

*Table 3-3. Index and Table Range*



*Figure 3-10. Empty Calibration Display*

## 3.6 Loaded Calibration

Use the following procedure to perform a loaded calibration proceed as follows.

1. Access Loaded Cal. from the Dynamic Cal. menu.
2. Perform 10 lifts with a known load in the bucket at decreasing rpm settings, starting at the max RPM with the bucket closed.

The Loaded Calibration menu includes the following data:

Setting	Description
Time	Time elapsed during the lift, obviously the lower this value, the greater the speed of the lift.
TP1 value	Indicates the piston's pressure transducer reading.
TP2 value	Indicates the rod's pressure transducer reading (if installed).
KnownLoad1	Set the known load for calibration 1: insert the value according to the machine's capacity, keeping in mind the decimals to be displayed, and the resolution preferred (this value can also be set at the completion of the calibration).
LT1 <sup>1</sup> point	Displays the number of lifts performed at decreasing speed, which will correspond to the number of points recorded in loaded calibration 1 table, (refer LT1 xxxx: -xxxxx)
LT1 xxxx: -xxxxx	Allows viewing the complete loaded calibration 1 table. It is possible to scroll through the table by selecting the index number.

*Table 3-4. Loaded Calibration Settings*

Setting	Description
KnownLoad2	Set the known load for calibration 2(if available): insert the value according to the machine's capacity, keeping in mind the decimals to be displayed, and the resolution preferred (this value can also be set at the completion of the calibration).
LT2 <sup>2</sup> point	Displays the number of lifts performed at decreasing speed, which will correspond to the number of points recorded in loaded calibration 2 table, (refer LT2 xxxx: -xxxxx).
LT2 xxxx: -xxxxx	Allows viewing the complete loaded calibration 2 table. It is possible to scroll through the table by selecting the index number.
Delete Cal. 1	Used to delete calibration 1 data.
Delete Cal. 2	Used to delete calibration 2 data.
Save	Save permanently all modifications to the loaded calibration.

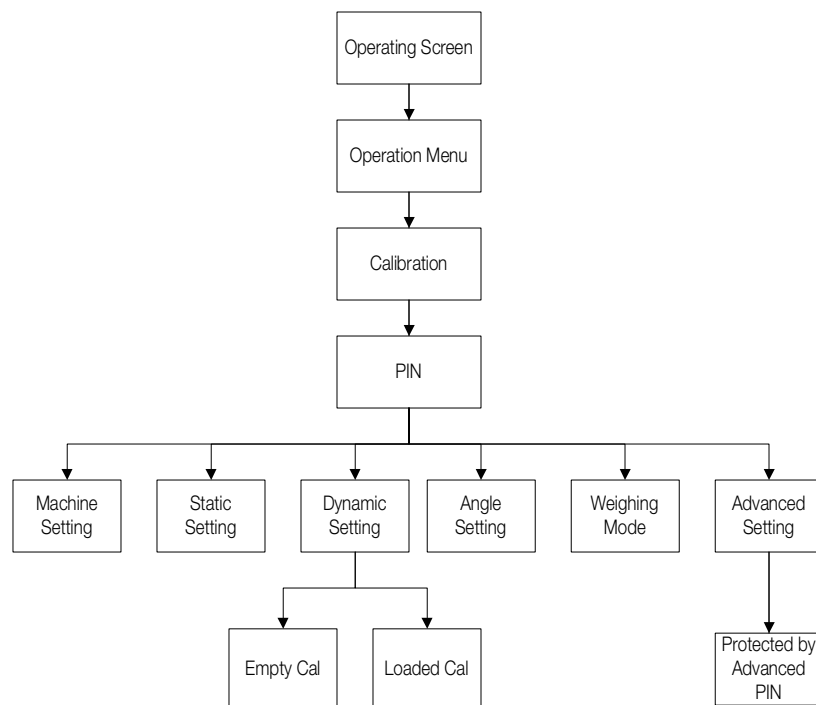
*Table 3-4. Loaded Calibration Settings*

1. Table loaded calibration 1 - First machine
2. Table loaded calibration 2 - Second machine, if exists

**NOTE:** Once the loaded calibration of 10 lifts is completed you must save the data to the memory.

Knownload is set based on what the measurement is used. Example: weight is 4230 lbs enter 4230 in knownload. If load is 2.31 ton enter 231.

## 3.7 Menu Flow Chart



*Figure 3-11. Calibration Menu Flow*

### 3.7.1 Setting New Values

Setting a new value, for example setting the Machine Setting, is completed using the following procedure.

Machine Setting  
Rod 1

1. Press and release the Print/Enter button. An asterisk will appear on line 1 above the value to be modified.

Rod 1           \*

Rod 1           0

2. Modify the value of each figure by pressing and releasing the Partial/Minus button to change the value.

Rod 1           \*

Rod 1           1

3. To shift the asterisk on the next value to be modified by pressing the Tare/Sel button.

Rod 1           \*

Rod 1           1

4. Increase or decrease the value by pressing and releasing the Partial/Minus or Total/Plus button.

Rod 1           \*

Rod 1           61

5. Press and release the Print/Enter button to save the changes. The asterisk will disappear.
6. Scroll to another page of the menu or return to the operation menu by pressing and holding the Tare/Sel button to the previous menu.

## 3.8 Calibration Menu

There are multiple functions accessible under the *Calibration* menu.

Menu Line	Menu Text	Type	Description
1	Setting Menu	Text	
2	Machine Setting	Access sub-menu	Access Machine Setting menu. Use to set weighing system main parameters.
2	Static Cal	Access sub-menu	Access to static calibration menu.
2	Dynamic Cal	Access sub-menu	Access to dynamic calibration menu, subdivided in two sections; empty and loaded.
2	Angle Setting	Access sub-menu	Access to angles calibration menu.
2	Advanced Setting	Access sub-menu	Reserved for manufacturer's settings.

Table 3-5. Calibration Settings Menu

### 3.9 Password (PIN) Menu

There are multiple functions accessible under the *Password (PIN)* menu.

Menu Line	Menu Text	Type	Description
1			
2	CAL. PIN XXXX	Setting	Insert the PIN to gain access to the calibration menu. See "Setting New Values" on page 21.
2	Enter to Confirm	Command	Press Enter to confirm the PIN setting.
2	Access Denied	Viewing	This message is displayed if the PIN is incorrect.

Table 3-6. Password Settings Menu

### 3.10 Machine Setting Menu

There are multiple functions accessible under the *Machine Setting* menu.

Menu Line	Menu Text	Type	Description
1	Machine Setting	Text	
2	Cylinder 1 xxxx	Setting	Setting lifting cylinder's circumference for calibration 1, set in cm.
2	Rod 1 xxx	Setting	Setting cylinder rod's circumference for calibration 1, set in cm.
2	Thickness1 xxxx	Setting	Setting lifting cylinder's thickness for calibration 1, set in cm.
2	Cylinder 2 xxxx	Setting	Setting lifting cylinder's circumference for calibration 2, set in cm.
2	Rod 2 xxxx	Setting	Setting cylinder rod's circumference for calibration 2, set in cm.
2	Thickness2 xxxx	Setting	Setting lifting cylinder's thickness for calibration 2, set in cm.
2	Round Val. xxxx	Setting	Setting rounding off value of partial weight. Default = 0
2	Active Angle x	Setting	Setting number for active angle sensor, range 0-1. 0 = Proximity Switch 1 = Angle Sensor (Default)
2	n.Decimals	Setting	Setting number of decimals for both partial and total weight, range 0-3. Default = 2
2	Unit Print	Command	Selecting units of measure (0-none, 1-Kg, 2-Tons, 3-Lb., 4-Short Tons, 5-Cubic Meters) which will be printed on the ticket. NOTE: Only available if a printer is installed.
2	Del Ticket Num.	Command	Zeroing the progressive number on the ticket.
2	Use Reg. x	Setting	Enable or disable the regenerative valve management.

Table 3-7. Machine Settings Menu

Menu Line	Menu Text	Type	Description
2	Th. Reg. xxxx	Setting	Setting threshold in reading Adc point to know if the regenerative valve is On or Off.
2	Save	Command	Saving permanently all modifications to parameters.

*Table 3-7. Machine Settings Menu*

### 3.11 Dynamic Setting Menu

There are multiple functions accessible under the *Dynamic Setting* menu.

Menu Line	Menu Text	Type	Description
1	Dynamic Setting	Text	
2	Empty Cal.	Access to sub-menu	Access to empty calibration menu.
2	Loaded Cal.	Access to sub-menu	Access to loaded calibration menu.

*Table 3-8. Dynamic Loaded Calibration Settings Menu*

## 4.0 Operation

---

The WLS-C system is based on the measurement of the lift cylinder piston pressure (by means of the pressure transducer) and the calculation of the raise speed (with angle sensor).

### 4.1 Making a Weighment

Use the following procedure to weigh a load based on the Active Weighing mode.

#### **Dynamic Weighing with 2 Proximity Sensors on Forklifts**

Following the initial lift off the ground, maintain a constant lifting speed during the complete weighing cycle. The WLS-C will begin calculating the load automatically when the first proximity is activated, and will be completed when the second proximity is then activated. The buzzer will start beeping when the first proximity is activated, and will continue until the completion of the weighing cycle. The partial load will then be added automatically to the total weight.

#### **Dynamic Weighing with 2 ASC or Proximity Sensors on Front Loaders**

Fill the bucket, begin lifting maintaining fully open raise function and a constant RPM speed during the complete weighing cycle. The WLS-C will begin calculating the load automatically when the ASC sensor angle start weigh angle is or when the first proximity is activated, and will be completed when the ASC sensor end weigh angle or second proximity is then activated. The buzzer will start beeping when the sensors are activated, and will continue until the completion of the weighing cycle. The partial load will then be added automatically to the total weight.

**NOTE:** Avoid weighing with the machine tilted sideways, and/or sloping forward or backward. Avoid sudden and/or abrupt movements during the weighing operation.

### 4.2 Setting a New Tare

Setting a new tare may be necessary when changing the actual bucket, changing the viscosity of the hydraulic oil in the circuit, or when some material accumulates in the bucket, which cannot be dislodged during normal dumping operation. It's a known fact that the quantity of material accumulated in a bucket, after the first few cycles, stays more or less constant, therefore by setting a new tare, it enables zeroing the extra weight of the bucket, weighing only the material effectively dumped in the body of the truck. It is advisable to verify the status of the tare prior to beginning loading operations, by performing an empty weighing; in the eventuality that the partial weight is not "0" carry out the tare zeroing as described below. Repeat this operation a few times during the day to compensate for the hydraulic oil temperature variations.

#### **Zeroing Existing Tare**

1. With an empty bucket, press and hold the Tare/Sel button until the lower LED is illuminated, the Tare value will be zeroed.

#### **Acquiring a new Tare:**

1. Perform an empty weighing based on the active weighing mode shown on the WLS-C screen. See "Making a Weighment" on page 24. for more information.  
The screen will display a value for the partial weight.
2. Press and release the Tare/Sel button.  
The upper LED will illuminate and the new Tare value will be acquired.

**NOTE:** To view the actual Tare value go to the User Menu by press and holding the Print/Enter button.

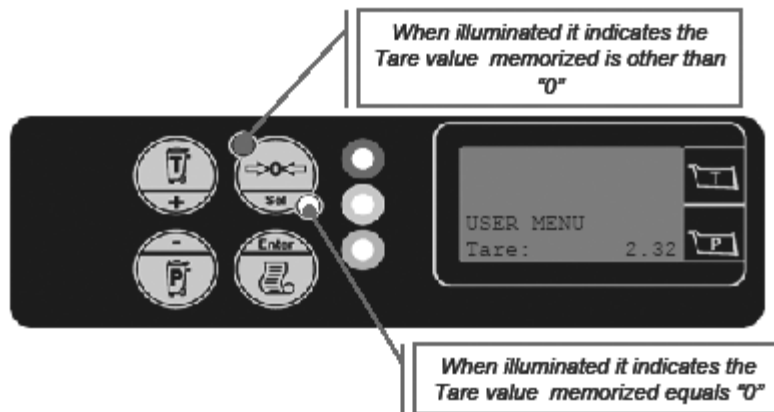


Figure 4-1. Actual Tare Value

### 4.3 Disabling the Weighing Feature

In the case that the machine may be required for alternative tasks while performing loading operations, and it is necessary to retain the value of load accumulated to that point, you can interrupt the operation by temporarily disabling the weighing cycle, and resume the operations later to complete the loading of that particular truck.

1. Press and hold the Print/Enter button to access the User menu.
2. Using the Partial/Minus button scroll down to the Weighing menu and press and release the Print/Enter button to disable the weighing.

The green LED will go out on the display. To enable follow the same procedure above.

On: Weighing Enabled

Off: Weighing Disabled

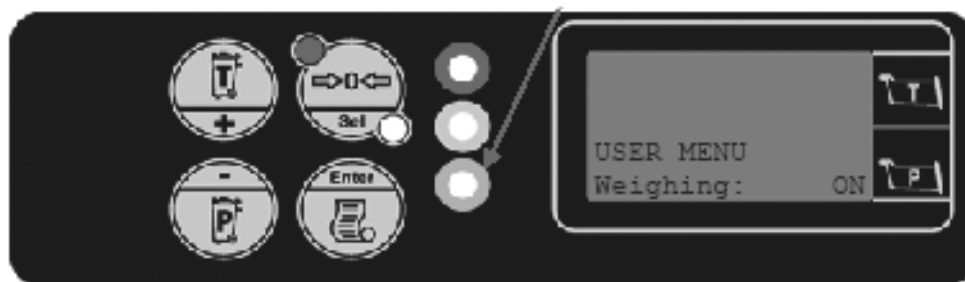


Figure 4-2. Weighing Enabled

### 4.4 Setting Max Load

Use the following procedure to set the maximum load in the user menu.

1. Press and hold the Print/Enter button until the User menu appears.
2. Scroll down to the Max Load page using the Partial/Minus button.
3. Press and release the Print/Enter button then follow the procedure “Setting New Values” on page 30 to modify the value.

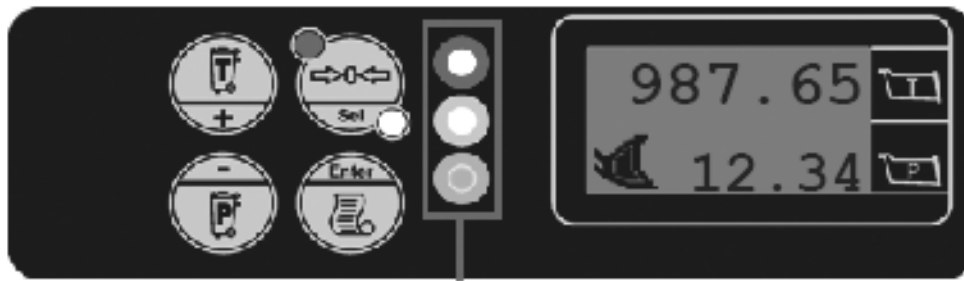


Figure 4-3. “Traffic Light” Function

The 3 LED’s on the WLS-C, as shown in Table 4-3, will illuminate according to the percentage of the Total Load lifted in relation to the Maximum Load. This is also known as the “Traffic Light” function.

- Green LED: lit when the Total Weight is between 0% and 89% of the Maximum Load set.
- Yellow LED: lit when the Total Weight is between 90% and 99% of the Maximum Load set.
- Red LED: lit when the Total Weight equals or exceeds 100% of the Maximum Load set.

**NOTE:** When exceeding the Maximum Load set for first time, the WLS-C will emit 3 rapid audible beeps and will continue each weighing that exceeds the Max load setting, until the Total Weight is zeroed (press and hold the Total/Plus button until the display indicates zero)

## 4.5 Machine Function

The WLS-C provides the ability to perform two independent calibrations,. This is typically used when the machine is equipped with 2 different lifting devices, for example bucket and forks.

Use the following procedure to select the desired calibration mode.

1. Press and hold the Print/Enter button for 3 seconds to enter the User Menu.
2. Scroll down using the Partial/Minus button until you see the Machine heading.
3. Press and release the Print/Enter button to change the Machine number.

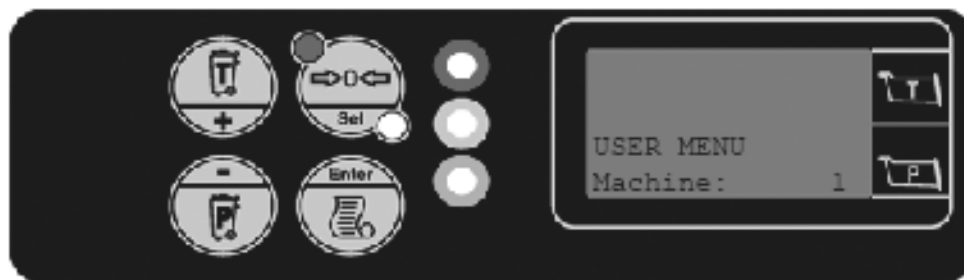


Figure 4-4. Machine Number

4. To return to the main operating screen press and hold the Tare/Sel button.

**NOTE:** This selection is not possible if the regenerative valve management is enabled.

## 4.6 Correction Function

The Correction function is used to adjust a constant error in each weighing cycle without changing the calibration.

1. Press and hold the Print/Enter button for 3 seconds to enter the User menu.
2. Scroll down using the Partial/Minus button until you see the Correction menu.
3. Press and release the Print/Enter button and follow the procedure “Setting New Values” on page 30 to modify the correction percentage.

It is possible to set a factor of  $\pm 10\%$  in relation to the calibration value. 110 indicates the maximum positive correction to increase the weighed load, 90 indicates the maximum negative correction factor to decrease the weighed load, and 100 means no correction factor should be set

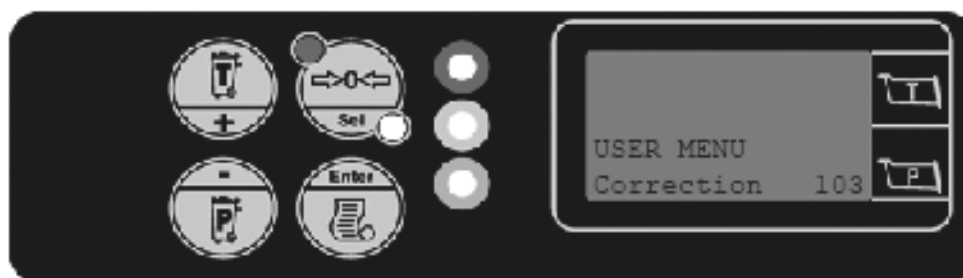


Figure 4-5. Correction Function

## 4.7 Adjust Display Contrast

Use the following procedure to adjust the display's contrast.

1. Press and hold the Print/Enter button for 3 seconds to enter the User menu.
2. Scroll down using the Partial/Minus button until you see the Contrast menu.
3. Follow the "Setting New Values" on page 30 procedure to modify the contrast value, which can be set to a minimum value of 60, and a maximum of 160 (by lowering the value the display will fade, and increasing the value it will darken). 110 is the normal setting.

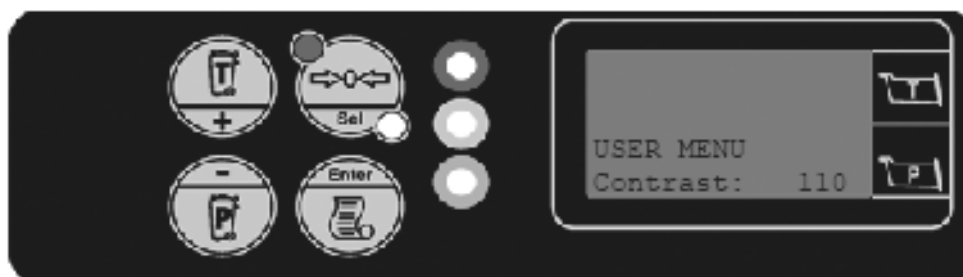


Figure 4-6. Display Contrast Normal Setting

## 4.8 Language Selection

Use the following procedure to select a language.

1. Press and hold the Print/Enter button for 3 seconds in the operating screen to change to the User menu.
2. Scroll down using the Partial/Minus button until you see the Language menu.

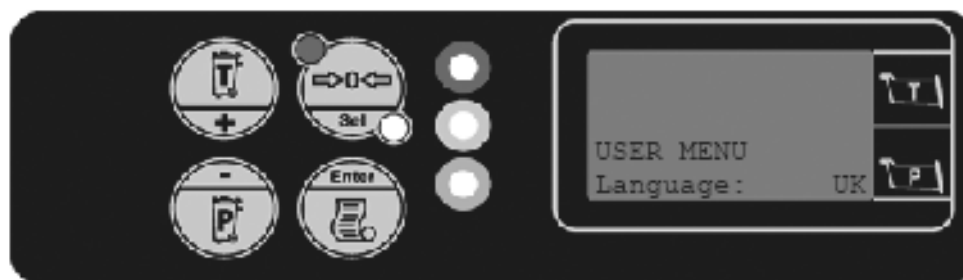


Figure 4-7. Language Selection

3. Press and release the Print/Enter button to change the language.

These are the languages available:

IT = Italian (Italiano)

UK = English

ES = Spanish (Espanol)

FR = French (Francais)

TR = Turkish

FM = Flemish

PT = Portuguese

GE = German

DK = Danish

To return to the operating display, press and hold the Tare/Sel button.

## 4.9 Setting Date and Time

Use the following procedure to set the date and time.

1. Press and hold the Print/Enter button for 3 seconds in the operating screen to change to the User menu.
2. Scroll down using the Partial/Minus button until you see the Time Setting menu.

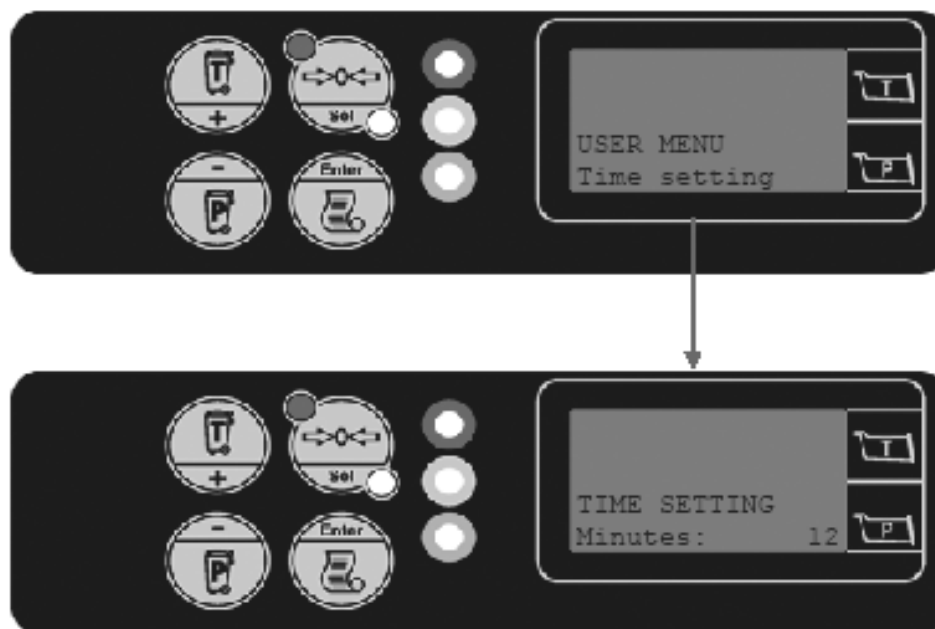


Figure 4-8. Time Setting

3. Press and release the Print/Enter button to select the time.
4. Use the Partial/Minus button to scroll to each sub-menu, then use the procedure “Setting New Values” on page 30 to set each feature: Minute, Hour, Day, Month, and Year.
5. To return to the Operating menu, press and hold the Tare/Sel button.
6. Scroll down using the Partial/Minus button until you see Updated Time.
7. Press and release the Print/Enter button
8. When prompted with the Enter to Confirm displayed on the second line on the screen, press and release the Print/Enter button again to confirm the modifications to Time Setting.

A message Time Updated! will be displayed for a few moments and then return to the Tare sub-menu.

## 4.10 Diagnostics

The “Sensors Check menu” allows viewing the status of all inputs and outputs.

1. Press and hold the Print/Enter button for 3 seconds to enter the User menu.
2. Scroll to the User menu from the operating screen.
3. Scroll down using the Partial/Minus button until you see the Sensors Check page.

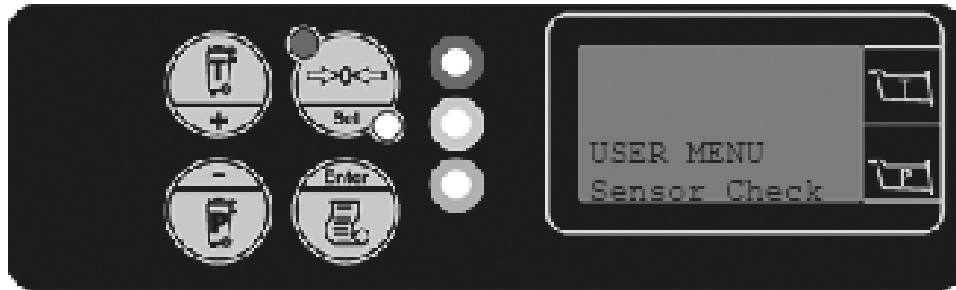


Figure 4-9. Sensor Check Menu

4. Press and release the Print/Enter button to enter the sub-menu.

### Proximity

To select the second Proxy press and release the Print/Enter button.

- Proxy 1 (to visualize the status of the 1stproximity switch)
- Proxy 2 (to visualize the status of the 2ndproximity switch)

The Proximity status is normally Off, however during the weighing cycle, they become active, the status is On momentary.

### On-Off Outputs

To select the Out 4 sub-menu, press and release the Print/Enter button.

- Buzzer (to visualize the status WLS-C internal buzzer, On when active)
- Out 4(to visualize the printer's power supply status if active or not, On when active).

### Pressure Sensors

To select the Press High, Boom Angle, Chassis Angle sub-menu by press and release the Print/Enter button.

- Press Low (to visualize the output value from the piston pressure transducer)
- Press High (to visualize the output value from the rod pressure transducer, if equipped.)
- Boom Angle (to visualize the output value from the boom ASC angle sensor.)
- Chassis Angle ( to visualize the output from the Chassis ASC angle sensor.)

## 4.11 Printing the Ticket

Use the following procedure to print a ticket.

1. Press and release the Print/Enter button (in the operation page) to activate the printing of the ticket.  
The printed ticket will show the following details:

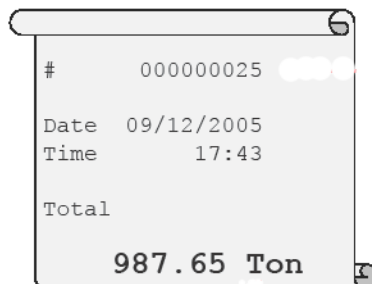


Figure 4-10. Printer Ticket Showing Progressive Number of Printed Tickets

## 4.12 Menu Flowchart

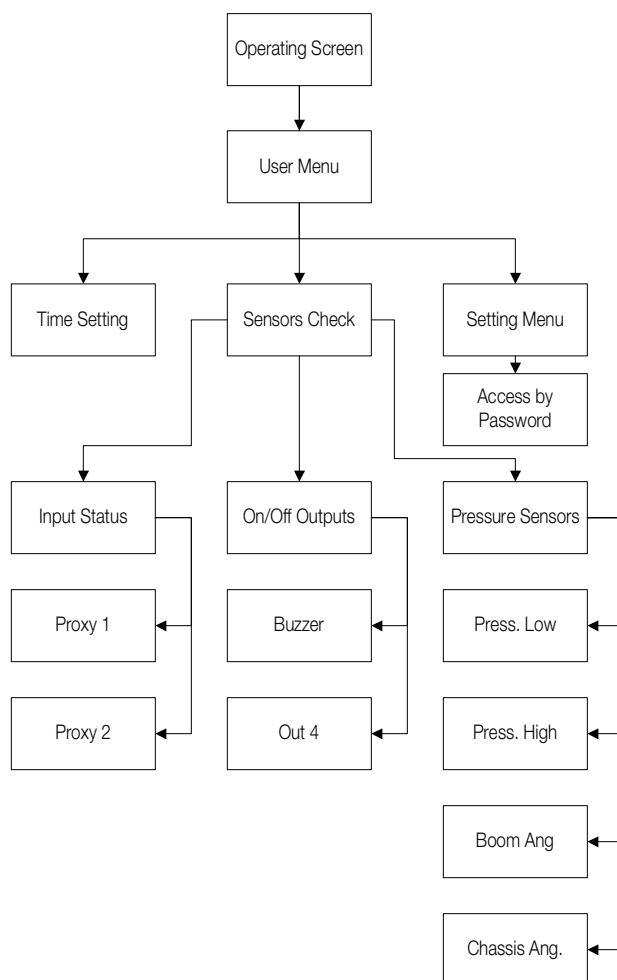


Figure 4-11. Operation Menu Flow

### 4.12.1 Setting New Values

Setting a new value, for example setting the Machine Setting, is achieved by using the following procedure..

```

USER Menu
Max Load  0.00
  
```

1. Press and release the Print/Enter button. An asterisk will appear on line 1 above the value to be modified..

```

          *
Max Load  0.00
  
```

2. Modify the value of each figure by pressing and releasing the Tare/Plus or Partial/Minus button to change the value..

```

          *
Max Load  0.06
  
```

3. To shift the asterisk on the next value to be modified by pressing the Tare/Sel button..

Max Load	0.06	*
----------	------	---

4. Increase or decrease the value by pressing and releasing the Partial/Minus or Total/Plus button..

Max Load	0.00	*
----------	------	---

5. Press and release the Print/Enter button to save the changes. The asterisk will disappear.
6. Scroll to another page of the menu or return to the operation menu by pressing and holding the Tare/Sel button to the previous menu.

## 4.13 User Menu

Use the following procedure to gain access to the User menu.

1. Press and hold the Print/Enter button for 3 seconds.
2. Scroll through using the Partial/Minus or Tare/Plus buttons.
3. Press and release the Print/Enter button to modify the sub-menu selected.

The following pages will show some tables describing all the existing menus in the system where:

- The first column refers to the line of the display in which the text is written.
- The second column describes the text shown on the display.
- The third column describes the type of function implied, such as:

Heading	Refers to the menu's title.
Visualize	To view a set or memorized value.
Settings	Refers to any value that can be modified.
Command	Enables a function by pressing a command key.
Sub-menu Access	Allows access to a sub-menu by pressing a command key.

*Table 4-1. Definition of Types in Menu Tables*

There are multiple functions accessible under the *User* menu.

Menu Line	Menu Text	Type	Description
1	User Menu	Heading	
2	Tare: x.xx	Visualize	Last Tare value.
2	Weighing: On/Off	Command	Weighing enabled (On) or disabled (Off)
2	Max Load: xxx.xx	Settings	Current maximum load for warning lights function.
2	Machine: x	Command	To activate calibration 1 or 2 during operation mode. Not available if regenerative valve present.

*Table 4-2. User Settings Menu*

Menu Line	Menu Text	Type	Description
2	Correction: xxx	Settings	Correction percentage of single weighing in case it may be necessary to correct minor errors detected in each weighing. Range: 90-110
2	Contrast: xxx	Settings	Display contrast
2	Language: UK	Command	Change menu language: UK = English IT - Italian ES = Spanish FR = French TR - Turkish FM = Flemish PT = Portuguese GE = German DK = Danish
2	Time Setting	Access sub-menu	Menu to set Time and Date
2	Sensors Check	Access sub-menu	Access to diagnostics menu allowing visualizing proximity and outputs status and to read transducers' values.
2	Setting Menu	Access sub-menu	Access to calibration menu (restricted to system's installer).

Table 4-2. User Settings Menu

## 4.14 Time Setting Menu

There are multiple functions accessible under the *Time Setting* menu.

Menu Line	Menu Text	Type	Description
1	Time Setting	Heading	
2	Minute	Settings	Settings to modify time and date.
2	Hour	Settings	Settings to modify time and date.
2	Day	Settings	Settings to modify time and date.
2	Month	Settings	Settings to modify time and date.
2	Year	Settings	Settings to modify time and date.
2	Update Time	Command	
2	Enter Confirm	Command	Confirm modification to Time and Date.
2	Time Updated	Visualize	Time and Date modified successfully.

Table 4-3. Time Settings Menu

## 4.15 Sensors Check Menu

There are multiple functions accessible under the *Sensors Check* menu.

Menu Line	Menu Text	Type	Description
1	Check Menu	Heading	
2	Proximity	Access sub-menu	Access to On/Off inputs menu.
2	On-off Output	Access sub-menu	Access to On/Off outputs menu.
2	Transducers	Access sub-menu	Access to analogue inputs menu.

*Table 4-4. Check Settings Menu*

### 4.15.1 Input Status Menu

Menu Line	Menu Text	Type	Description
1	Input Status	Heading	
2	Proxy 1 On/Off	Visualize	Visualize input status of Proximity 1
2	Proxy 2 On/Off	Visualize	Visualize input status of Proximity 2.

*Table 4-5. Proximity Settings Menu*

### 4.15.2 On/Off Outputs Menu

Menu Line	Menu Text	Type	Description
1	Output Status	Heading	
2	Buzzer On/Off	Visualize	Internal Buzzer.
2	Out 4 On/Off	Visualize	Printer Status.

*Table 4-6. On/Off Settings Menu*

### 4.15.3 Pressure Sensor Menu

Menu Line	Menu Text	Type	Description
1	Analogue Value	Heading	
2	Press. Low xxxx	Visualize	Piston side transducer output value
2	Press. High xxxx	Visualize	Rod side transducer output value
2	Boom Ang xxxx	Visualize	Boom Angle Sensor
2	Chassis Ang xxxx	Visualize	Chassis Angle Sensor

*Table 4-7. Pressure Sensor Settings Menu*

## 5.0 Printer (Optional)

---

The WLS-C roll tape printer is a very easy to use 24 columns thermal printer. The printer has a thermal printing head, fast type, and is to be used with standard thermal roll that are 57.5 mm width. Due to its lightness and compact size, it can be easily fitted into a wide range of applications. The WLS-C roll paper printer includes customized programming capability making it capable to meet customized requirements. The printer includes a standard interface RS 232 link, however an external power supply, direct current voltage, is not included but is required.



*Figure 5-1. Printer Unit*



*Figure 5-2. Printer Installed in Cab*

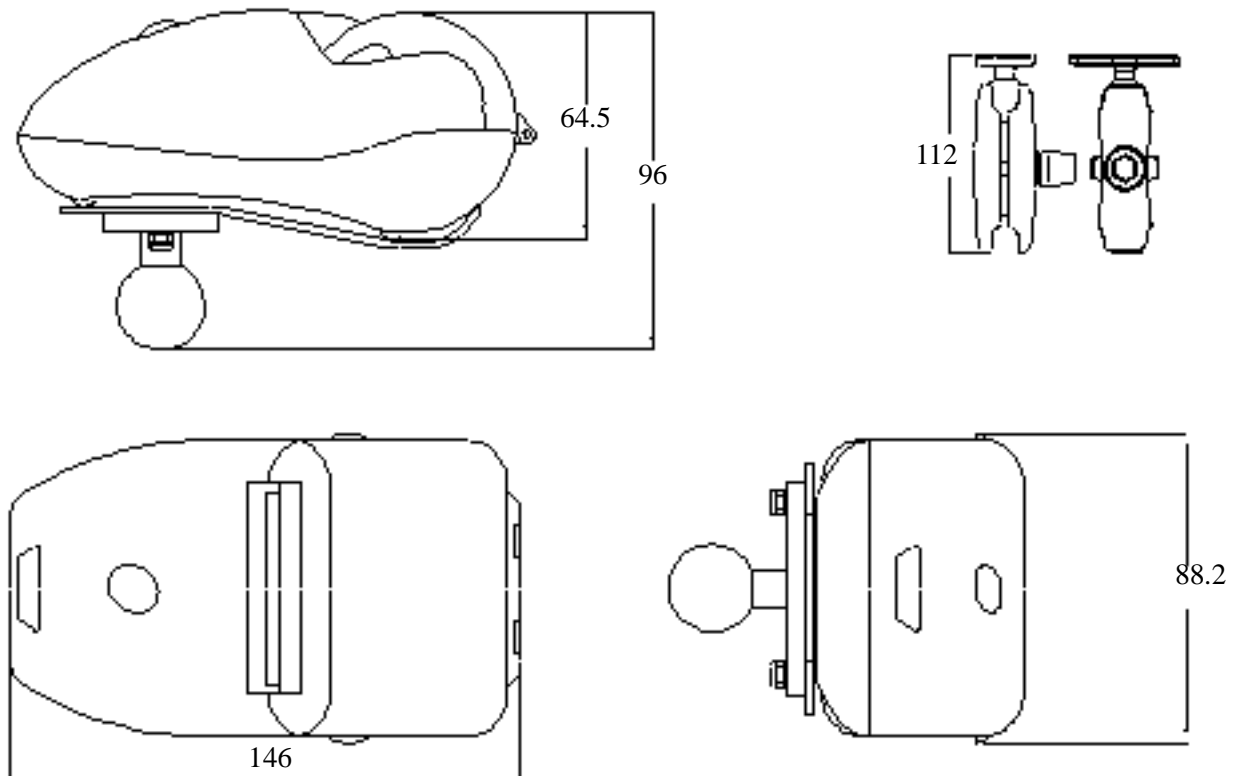
WLS-C roll tape printer is provided with a single RJ11 pins connector including a RS232 link. Is also available with a rugged connector cable

Printer		CV1 STP6/10 cable connector	
PIN	Signal	PIN	Signal
1	+VB Power Supply	A	Power Supply
2	GND Signal ground	B	RX Input
3	RX Serial link input signal	C	TX Output
4	TX Serial link output signal	D	Ground
6	GND		

*Table 5-1. Interface Connections*

## 5.1 Specifications

Printer Method	Thermal printing
Resolution	203 dpi
Printing speed	> 50 mm/sec typical
Column number	24
Character set	ASCII standard, International
Print format	Normal, Double
Paper width	58 mm
Paper roll dimension	57.5 mm ±1 mm
Interface	RS232
Baud Rate	600 to 38.400 bps
Receiver buffer	128 byte
Flash memory	32K
Graphic memory	1 logo of 348 x 85 dot
Power supply	10-30 VDC
Current consumption	During printing 600mA (idle 20mA)
Dimensions	146 x 88 x 96(with holding plate)
Weight	605 gr. approx (Printer and holding bracket)
Operating Temperature Range	-20 to + 70°C
Storage Temperature Range	-40°C to + 80° C
Relative Humidity	10% to + 90 %
Housing Protection	IP40



*Figure 5-3. Printer Dimensions*

# WLS-C Limited Warranty

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Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. RoughDeck fabricated platforms and weldments are warranted against defects in materials and workmanship for five (5) years. Load cells and all other components are warranted for two (2) years.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, "Protecting Your Components From Static Damage in Shipment," available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

**THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER RLWS NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

**RLWS AND BUYER AGREE THAT RLWS' SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.**

**SHOULD THE SELLER BE OTHER THAN RLWS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.**

No terms, conditions, understanding, or agreements purporting to modify the terms of this warranty shall have any legal effect unless made in writing and signed by a corporate officer of RLWS and the Buyer.

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# For More Information

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## System Manuals

- WLS-C Wheel Loader Scale Installation & User Manual, PN 115203

## Literature

- WLS-1/WLS-C Wheel Loader Scales Sales Literature, PN 103216

## Web Site

- WLS-C Wheel Loader Scale Product Page at <http://www.ricelake.com/product.aspx?CatID=4602>
- Frequently Asked Questions (FAQs) at <http://www.ricelake.com/faqs.aspx>

## Contact Information

### Hours of Operation

Knowledgeable customer service representatives are available 6:30 a.m. - 6:30 p.m. Monday through Friday and 8 a.m. to 12 noon on Saturday. (CST)

### Telephone

- Sales/Technical Support 800-472-6703
- Canadian and Mexican Customers 800-321-6703
- International 715-234-9171

### Immediate/Emergency Service

For immediate assistance call toll-free 1-800-472-6703 (Canadian and Mexican customers please call 1-800-321-6703). If you are calling after standard business hours and have an urgent scale outage or emergency, press 1 to reach on-call personnel.

### Fax

Fax Number 715-234-6967

### Email

- US sales and product information at [prodinfo@ricelake.com](mailto:prodinfo@ricelake.com)
- International (non-US) sales and product information at [intlsales@ricelake.com](mailto:intlsales@ricelake.com)

### Mailing Address

Rice Lake Weighing Systems  
230 West Coleman Street  
Rice Lake, WI 54868 USA





230 W. Coleman St. • Rice Lake, WI 54868 • USA  
U.S. 800-472-6703 • Canada/Mexico 800-321-6703  
International 715-234-9171

**[www.ricelake.com](http://www.ricelake.com)**  
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